APR/FY06

FORT LEONARD WOOD

Missouri

Army Defense Environmental Restoration Program Installation Action Plan

Final 31 August 2006

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Statement of Purpose

The purpose of the Installation Action Plan (IAP) is to outline the total multi-year Cleanup Program for an installation. The plan identifies environmental cleanup requirements at each site or area of concern, and proposes a comprehensive, installation-wide approach, with associated costs and schedules, to conduct investigations and necessary remedial actions.

In an effort to coordinate planning information between the restoration manager, US Army Environmental Center (USAEC), Fort Leonard Wood, Kansas City District Corps of Engineers, Missouri Department of Natural Resources (MDNR), and US Environmental Protection Agency (USEPA) Region 7, an IAP was completed The IAP is used to track requirements, schedules and tentative budgets for all Army installation cleanup programs.

All site-specific funding and schedule information has been prepared according to projected overall Army funding levels and is, therefore, subject to change.

The following agencies contributed to the formulation and completion of this Installation Action Plan during a planning workshop held on 13 April 2006:

Company/Installation/Branch
e2m

Engineering & Environment, Inc. for US Army Environmental Center (USAEC)

Engineering & Environment, Inc. for Fort Leonard Wood

Fort Leonard Wood

Missouri Department of Natural Resources (MDNR)

ODEP/Assistant Chief of Staff for Installation Management (ACSIM)

US Environmental Protection Agency (USEPA) Region 7

US Department of Agriculture (USDA) Forest Service

US Army Corps of Engineers (USACE) - Kansas City District

USAEC

USACE – Omaha District

Acronyms & Abbreviations

AEDB-R	Army Environmental Database - Restoration
AIT	Advanced Individual Training
AMCOM	Army Aviation and Missile Control
ANCOC	Advanced Non-commissioned Officer Course
ANG	Air National Guard
AST	Aboveground Storage Tank
BCM	Buried Chemical Munitions
BCT	Basic Combat Training
BNCOC	Basic Non-commissioned Officer Course
BRAC	Base Realignment and Closure
BTEX	Benzene, Toluene, Ethyl benzene and Xylene
CENWK	Corps of Engineers, Kansas City District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1980)
CMPSC	Charles Melvin Price Support Center
CTC	Cost-to-Complete
CTT	Closed, Transferred, or Transferring
cy	cubic yards
DD	Decision Document
DEH	Directorate of Engineering and Housing
DERA	Defense Environmental Restoration, Army
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DoD	Department of Defense
DOL	Directorate of Logistics
DPW	Directorate of Public Works
DRMO	Defense Reutilization and Marketing Office
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
ER,A	Environmental Restoration, Army (formerly called DERA)
FDE	Findings and Determination of Eligibility
FLW	Fort Leonard Wood
FOST	Finding of Suitability to Transfer
FS	Feasibility Study
ft	foot
FUDS	Formerly Used Defense Sites
FY	Fiscal Year
gpd	Gallons Per Day
GW	Groundwater
HE	High Explosive
HMX	type of explosive
HRR	Historical Records Review
IAP	Installation Action Plan
IMA-NWRO	Installation Management Agency-Northwest Regional Office
IRA	Interim Remedial Action

Acronyms & Abbreviations

IRP	Installation Restoration Program
ITRO	Inter-service Training Review Organization
JP-4	type of fuel
K	$1,000
LUC	Land-use Control
LTM	Long-Term Management
MACOM	Major Army Command
MANSCEN	Maneuver Support Center
MCL	Maximum Contaminant Level
MDNR	Missouri Department of Natural Resources
MGD	Million Gallons per Day
mg/kg	milligram per kilogram
MMRP	Military Munitions Response Program
MO	Missouri
MOS	Military Occupational Specialty
MP	Military Police
MSL	mean sea level
MTOC	Motor Transport Operations Course
NCO	Non-Commissioned Officer
NE	Not Evaluated
NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OB/OD	Open Burning/Open Detonation
OE	Ordnance and Explosives
OU	Operable Unit
PA	Preliminary Assessment
PP	Proposed Plan
ppb	part per billion
PBC	performance based contract
PCB	Polychlorinated Biphenyl
PCE	Tetrachlorethylene
PCP	pentachlorophenol
PLDC	Primary Leadership Development Course
POL	Petroleum, Oil & Lubricants
POM	Program Objective Memorandum (budget)
RA	Remedial Action
RAB	Restoration Advisory Board
RAC	Risk Assessment Code
RACER	Remedial Action Cost Engineering and Requirements
RA(O)	Remedial Action - Operation
RC	Response Complete
RCRA	Resource Conservation and Recovery Act

Acronyms & Abbreviations

RD	Remedial Design
RDX	type of explosive
REM	Removal
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
RIP	Remedy in Place
ROD	Record of Decision
RRSE	Relative Risk Site Evaluation
RSC	Reserve Support Command
SI	Site Inspection
SLAAP	Saint Louis Army Ammunition Plant
SLDC	Saint Louis Development Corporation
SLOP	Saint Louis Ordnance Plant
STP	Sewage Treatment Plant
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TA	Training Area
TAPP	Technical Assistance for Public Participation
TCE	Trichloroethylene
TCLP	Toxicity Characteristic Leaching Procedure
TD	touch down
TNT	Trinitrotoluene
TPH	Total Petroleum Hydrocarbon
TRC	Technical Review Committee
µg/l	micrograms per liter
USACE	United States Army Corps of Engineers
USACHPPM	United States Army Center for Health Promotion and Preventive Medicine
USAEC	United States Army Environmental Center (formerly called USATHMA)
USAEHA	United States Army Environmental Hygiene Agency (now called USACHPPM)
USATHMA	United States Army Toxic and Hazardous Material Agency (now called USAEC)
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
VC	Vinyl Chloride
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
VSI	Visual Site Inspection
WSOW	Weldon Spring Ordnance Works
WSTA	Weldon Springs Training Area
WWTP	Waste Water Treatment Plant

Installation Information

Installation Locale Fort Leonard Wood lies in Townships 33N to 36N and Ranges 10W to 13W. The facility occupies 61,410.15 acres and is located approximately 30 miles southwest of Rolla, Missouri. The facility lies almost entirely in Pulaski County with small portions in Laclede and Texas Counties, all in the south central part of Missouri. Fort Leonard Wood is bordered on the west by Roubidoux Creek and on the east by the Big Piney River. Two small towns, Waynesville and St. Roberts, are located directly north of the facility.

Installation Mission: A values-based organization that provides quality Base Operations Services to enable all units to accomplish their mission; to enhance the well-being of our Fort Leonard Wood community.

Lead Organization:
Installation Management Agency – Northwest Region

Lead Executing Agencies: Installation and Corps of Engineers, Kansas City District (CENWK)

Regulatory Participation
State: Missouri Department of Natural Resources (MDNR), Federal Facilities Section

National Priorities List (NPL) Status: Not on NPL

Installation Restoration Advisory Board (RAB)/Technical Review Committee (TRC)/Technical Assistance for Public Participation (TAPP) Status:
No RAB/TRC/TAPP has been established at this time.

Installation Program Summaries
IRP
Primary Contaminants of Concern: Solvents, Metals, Petroleum, Oil and Lubricants (POL), Pesticides, Organics, Explosives
Affected Media of Concern: Soil, Surface Water, Groundwater
Estimated Date for Remedy-In-Place (RIP)/Response Complete (RC): 2006 / 2010
Funding to date (up to FY05): $14,735,000
Current year funding (FY06): $325,041
Cost-to-Complete (FY07+): $27,962,000

MMRP

Primary Contaminants of Concern: OE, Lead, Arsenic
Affected Media of Concern: Groundwater, Soil
Estimated Date for RIP/RC: September 2013 (with indefinite LUCs)
Funding to date (up to FY05): $25,000
Current year funding (FY06): $415,000
Cost-to-Complete (2007+): $10,171,000

Installation Historic Activity

Fort Leonard Wood is located in central Missouri, about 120 miles southwest of St. Louis, Missouri, and 85 miles northeast of Springfield, Missouri along Interstate Highway 44. The installation occupies approximately 61,410 acres and is located primarily in Pulaski County, with small portions in Texas and Laclede counties.

Fort Leonard Wood was established in 1940 as a Basic Training Center. The Basic Training Center has evolved into the Maneuver Support Center (MANSCEN). MANSCEN's mission is to provide the nation with individuals strengthened by values, leaders, and teams trained in basic combat skills, as well as advanced individual skills in chemical, engineer, military police, and transportation disciplines.

Fort Leonard Wood accomplishes training through its Command Group, the United States Army Chemical, Engineer, and Military Police Schools, Training Brigades and Garrison staff. The 1st Engineer Brigade provides Advanced Individual Training (AIT) and one station unit training in a variety of military specialties. In 1995, the Brigade started training members of the Air Force, Navy and Marines in several military specialties. The different services are not in the brigade, but work closely together, along with the Interservice Training Review Organization (ITRO). The Brigade also is responsible for teaching the Officer's Basic and Captain's Career Officer courses, Warrant Officer courses and the Sapper Leader course. The 1st Engineer Brigade occupies buildings primarily in the 800 area of Fort Leonard Wood.

The 3rd Training Brigade conducts Army Basic Combat Training (BCT) at Fort Leonard Wood. The 3rd Training Brigade trains over 16,000 soldiers annually in the three phases of basic combat training. The 3rd Training Brigade primarily occupies buildings in the 600 area.

The 3rd Chemical Brigade provides command, control, administration, supply, housing and training for the 82nd Chemical Battalion, the 84th Chemical Battalion, the 58th Transportation Battalion, and the International Students Company. The 3rd Chemical Brigade also implements Military Occupational Specialty (MOS), professional development, and functional course training. The Chemical Defense Training Facility is under the control of the 3rd Chemical Brigade. The 3rd Chemical Brigade occupies buildings in the 700 area.

Fort Leonard Wood is also the home of the U.S. Army Military Police School. The 14th Military Police Brigade provides command, control, administration, supply, housing and selected training for assigned cadre, basic trainees, professional and functional courses students and military police students. The 14th Military Police Brigade occupies buildings located in the 1000 area.

Additionally, the MANSCEN NCO Academy hosts the Primary Leadership Development Course (PLDC), Basic Noncommissioned Officer Course (BNCOC), Advanced NCO Course (ANCOC) and Drill Sergeant Schools.

Fort Leonard Wood is located in the west-central part of the Salem Plateau of the Ozark Physiographic Province. Commonly referred to as the Ozark carbonate area, the regional geomorphology comprises karsts features (soluble rock) including permeable bedrock, permeable soils, springs, caves, sinkholes, and massive rock bluffs along streams. Three Ordovician carbonate formations crop out in the area of Fort Leonard Wood: the Jefferson City Dolomite, the Roubidoux Formation, and the Gasconade Dolomite.

The Jefferson City Formation is the youngest formation remaining in the Fort Leonard Wood area and is restricted to the top of the high ridge that separates the Big Piney River and Roubidoux Creek watersheds. In general, the Jefferson City Formation occurs only where ground elevation is greater than approximately 1,110 ft above mean sea level (MSL). The formation, which varies from 0 to 220 feet in thickness, is thin-bedded finely- to medium- crystalline dolomite interbedded with numerous massive, cherty dolomite beds, and rare thin shale beds.

The Roubidoux Formation, which underlies the Jefferson City formation, crops out over the extent of the post and has weathered to form extensive residual soils. When unweathered, the Roubidoux Formation is composed of tan to buff-colored, finely- to medium-crystalline, thin- to thick-bedded, vuggy dolomite with abundant chert and sandstone lenses. Roubidoux thickness varies from 0 to 180 feet.

The Gasconade Formation is the oldest strata to crop out at Ft. Leonard Wood. Surface exposure of the formation is limited to deeply eroded stream valley bottoms of Roubidoux Creek and Big Piney River. The Gasconade Formation is divided into two units: 1) the Upper Gasconade, which is the lowest stratigraphic unit to outcrop at FT. LEONARD WOOD and is composed of finely- to coarsely-crystalline, generally chert-free, vuggy dolomite; and 2) the Lower Gasconade, which is composed of finely- to medium-crystalline cherty dolomite with rare, thin beds of sandstone. Upper Gasconade thickness varies from 0 to 100 feet, and Lower Gasconade thickness ranges from 205 to 385 ft. A thin (10 to 45 ft) dolomite-cemented, medium-grained sandstone unit, called the Gunter Sandstone Member, occurs at the base of the lower Gasconade. The base of the Gunter Sandstone Member represents the contact between the Ordovician and Cambrian Systems.

Cambrian strata underlie the Gasconade Formation and are composed of the Eminence Dolomite and the underlying Potosi Dolomite. Both are medium-crystalline and massively bedded. The Potosi Dolomite contains abundant chert and quartz druse, whereas, in the Eminence Dolomite, chert occurs only in small amounts in the upper part of the formation.

Subsequent to their deposition, these sediments were deeply buried beneath younger Paleozoic and Mesozoic sediments. More recently, the rocks have been uplifted and subaerially exposed. The uplift of the area also produced numerous fractures and northwest trending faults in the region. At the surface, the rocks are exposed to fresh water, which preferentially flows through these fractures and result in the dissolution of the carbonate rocks and to the formation of caves and sinks. Erosion from surface water, creeks, and rivers, has dissected the relatively flat strata producing the karst topography.

SAINT LOUIS ORDNANCE PLANT Ft. Leonard Wood was the owner of a portion of the Saint Louis Ordnance Plant (SLOP) in its role as the support installation for the reserve center located on this site. The SLOP was an industrial complex for the manufacture of propellants and primers. In September 1996, the ownership and remediation responsibility for the SLOP site was transferred to the 89th Reserve Support Command (RSC) headquartered in Wichita, Kansas.

SAINT LOUIS ARMY AMMUNITION PLANT The Army retained control of a small portion, 23 acres, of the former 270 acre Saint Louis Ordnance Plant (SLOP). This area is designated as the former Saint Louis Army Ammunition Plant (SLAAP). On 29 January 2003, Ft. Leonard Wood assumed ownership responsibility from the U.S. Army Aviation and Missile Command (AMCOM). This parcel was declared excess to the Army's needs in 1989 and was being managed as a non-BRAC excess property until its transfer to the City of St. Louis in 2006.

WELDON SPRING ORDNANCE WORKS WSOW is a 17,000 acre former trinitrotoluene (TNT) and dinitrotoluene (DNT) manufacturing plant. After excessing most of the 17,000 acres, the Army retained the contaminated production area, which now makes up the Weldon Springs Training Area (WSTA). Fort Leonard Wood had been responsible for accountability, security, facilities engineering support, and logistic support, for this facility until transfer to the 89th RSC in December 2004.

IRP

- Prior Year Progress: The RI/FS for FLW-056 has been completed and two RIs are underway at FLW-002 and FLW-003
- Future Plan of Action: A three phase approach to completion of the IRP has been launched. All remaining RI's and RA at two sites, FLW-056 and FLW-037 will be included in the Phase 1 PBC to be awarded late FY06. Phase 2 is expected to be awarded in late FY07 and will include the RD/RA for FLW-002 and FLW-003.

MMRP

- Prior Year Progress: The PA's for all six existing sites have been completed.
- Future Plan of Action: Conduct SI on five sites. FTLWD-003-R-01 has been designated a FUDs and will be handled separately.

FORT LEONARD WOOD

Installation Restoration Program

Total AEDB-R IRP Sites / AEDB-R sites with Response Complete: 68/58

Different Site Types:

1 Burn Area	7 Storage Areas
1 Surface Disposal Area	15 Underground Storage Tanks
1 Sewage Treatment Plant	1 Waste Treatment Plant
1 Bldg Demo/Debris Removal	2 Spill Site Areas
3 Surface Impoundment Lagoons	2 Pesticide Shops
1 Above Ground Storage Tank	22 Landfills
2 Explosive Ordnance Disposal Areas	3 Incinerators
5 Fire/Crash Training Areas	1 Contaminated Fill

Most Widespread Contaminants of Concern: Solvents, Metals, Petroleum, Oil and Lubricants (POL), Pesticides, Organics, Explosives

Media of Concern: Soil, Surface Water, Groundwater

Completed Removal (REM)/Interim Remedial Action (IRA)/Remedial Action (RA):

Total IRP Funding

Prior years (up to FY05):	$14,735,000
Current year funding (FY06):	$ 325,041
Future Requirements (FY07+):	$27,962,000
Total:	$43,022,041

Duration of IRP

Year of IRP Inception: 1985
Year of IRP RIP/RC: 2010
Year of IRP Completion including Long-Term Management (LTM): 2035

IRP Contamination Assessment

IRP Contamination Assessment Overview

MDNR does not have a state superfund program. Ft. Leonard Wood is following a non-NPL Comprehensive Environmental Response Compensation and Liability Act (CERCLA) process at all of the sites. The Post has been the subject of numerous studies (listed in 'Previous Studies') to determine the extent and occurrence of possible contamination. These studies have been conducted by both the Army and U.S. EPA Region 7 and have encompassed the whole of the Ft. Leonard Wood installation. These studies to date have not resulted in the issuance of Notices of Violations or Consent Orders/Agreements. Contaminants at these sites include solvents, metals, pesticides, POL, explosives, and PCP.

Based on the numerous studies, Fort Leonard Wood has identified 68 IRP sites as having the possibility to cause contamination. Ten sites (FLW-001, 002, 003, 006, 008, 012, 028, 056, 059, 060) have been identified for further investigation and/or remediation, with remedial investigations underway at two sites (FLW-002 and 003) and a complete RI/FS at FLW-056. Five sites (FLW-012, 013, 014, 015, 016) have been combined and are managed under the designation FLW-012. 58 sites (see 'Response Complete' and 'No Further Action' List in the Schedule Section) have been tentatively identified for closure. The possibility exists that more information will be obtained on these sites, which may make it necessary to conduct further investigations or remedial activities.

IRP Cleanup Exit Strategy

The Fort Leonard Wood IRP began in 1986 after Congress established the Defense Environmental Restoration Program (DERP) and is scheduled to be completed in 2015.

The Fort Leonard Wood IRP has 68 sites on Fort Leonard Wood and also monitors one non-BRAC excess property, the Charles Melvin Price Support Center, (CMPSC) in Granite City, Illinois, which is being managed by the BRAC division.

Fort Leonard Wood coordinates with the State of Missouri on all IRP activities.

Of the 68 sites on Fort Leonard Wood, 10 are being investigated or will be investigated shortly. These ten sites consist of one former dry cleaner, one former fire training area, and eight landfills.

Investigations conducted to date indicate that past disposal practices have contaminated soils and ground water at Fort Leonard Wood. The contaminants of concern include chlorinated solvents (PCE, TCE, VC) and metals (Pb, Mn, Cr, Hg, etc). However, all contaminants are present at low levels and do not pose an immediate threat to human health or the environment. No contaminants have been found in Fort Leonard Wood drinking water wells. Springs in the area have also been sampled with Shanghai Spring (off-post) being the only one containing PCE, at half of the allowable level for drinking water; however, ongoing investigations indicate that Fort Leonard Wood may not be a significant contributor (if at all) to contamination in Shanghai Spring.

IRP Contamination Assessment

To complete the remaining work, three separate performance based contracts will be procured. Phase one is scheduled for award in August 2006 and will cover all remaining investigations as well as cleanup at FLW-037 and FLW-056. Phase two will finalize the FS for FLW-002 and FLW-003 and any necessary remedial action. Phase three will finalize the remedial actions at all remaining sites and begin the long term management and closeout of the IRP.

Previous Studies

1982

- Installation Assessment of the U.S. Army Training Center Report No. 322 1982 DRXTH-AS-82322, Environmental Science and Engineering

1988

- Hazardous Waste Consultation No. 37-26-1646-88 Evaluation of Solid Waste Management Units, USAEHA, June-July
- Geohydrologic Study, USAEHA, July
- Investigation of Closed Sanitary Landfills, USAEHA, September

1990

- Sampling Visit, USAEHA, July

1992

- Final RCRA Facility Assessment Report, PRC Environmental Management Inc, September

1993

- Ground Water Quality Consultation NO 38-26-KV44-93 RCRA Facility Assessment Sampling Visit, USAEHA, March – April

1994

- Geohydrologic and Water Quality Assessment Report 96-4270, U.S. Geological Survey Water Resources Investigations

1995

- Geohydrology and Water Quality at Shanghai Spring and Solid Waste Management Units Report 00-4178, U.S. Geological Survey Water Resources Investigations
- Baseline Contaminant Study for Fort Leonard Wood, Missouri, Burns & McDonnell

1996

- Geology of the Fort Leonard Wood Military Reservation and Adjacent Areas, South Central Missouri., U.S. Geological Survey Water Resources Investigations

2003

- Geohydrologic Framework, Ground-Water Hydrology, and Water Use in the Gasconade River Basin Upstream from Jerome, Missouri, including the Fort Leonard Wood Military Reservation, U.S. Geological Survey Water Resources Investigations

FORT LEONARD WOOD

Installation Restoration Program
Site Descriptions

FLW-001
LANDFILL 1

SITE DESCRIPTION

This landfill is located 0.2 mile west of the intersection of roads FLW 1 and FLW 38 in the central portion of the post. It occupies approximately 3.2 acres, and is a closed sanitary landfill. It operated between 1942 and 1968. USAEHA 1987-88 recommended no further action for this site. The 1992 RFA noted no known contamination and also noted the site was regulated by MDNR. Presently, the landfill is completely covered with vegetation and no exposed trash is evident. Personnel from Fort Leonard Wood and MDNR did a walk over in May 1994 and found no evidence of subsidence or leachate. Based on the USAEHA recommendations, no data collection was conducted for this site.

During the FY05 IAP, MDNR indicated that an evaluation would be necessary for this prior to being declared RC.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: NE

CONTAMINANTS OF CONCERN:
Chlorinated Solvents

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

Phases	Start	End
PA	198712	198807
SI	198712	198807
RI/FS	200609	200903
LTM	200910	201909

RC DATE: 200903

CLEANUP STRATEGY

This site is included in the phase one PBC to be awarded in August 2006. The site will be evaluated and either an RI/FS or NFRAP will be prepared. It is expected, based on discussions with MDNR, that monitoring will be necessary for 10 yrs or 2 5-yr reviews. LTM will be included in the phase three PBC.

FLW-002
LANDFILL 2

SITE DESCRIPTION

FLW-002 (Landfill No. 02) is a 34.4-acre inactive soil covered sanitary landfill that operated between 1981 and 1985. It is in the west-central portion of Ft. Leonard Wood, 2.5 miles south of Forney Army Airfield and 0.5 miles west of road FLW 1. FLW-002 was permitted by the MDNR in 1978 for disposal of wastes excluding industrial wastes (USAEHA, 1987). These wastes included sanitary wastes and sludges from the print shop and dry cleaning wastes. This landfill was required to close early due to the discovery of a bedrock high encountered during operation, leading There has not been any exposed waste since the landfill became inactive. The primary concern at this site is potential groundwater contamination.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Medium

CONTAMINANTS OF CONCERN:
Chlorinated Solvents

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

Phases	Start	End
PA	198712	198807
SI	199410	199511
RI/FS	199701	200611
RD	200612	200704
RA(C)	200705	200808
LTM	200808	203808

RC DATE: 200808

Prior to Aug 2000, the landfill surface was irregular, vegetated with brush and small trees, and contained a bedrock outcrop on the west central portion of the landfill. On the eastern edge of the outcrop, leachate was observed on the surface. Leachate was also observed along the northeastern face of the landfill. This leachate drained north through a culvert beneath a bordering gravel road. To repair the landfill surface in accordance with MDNR permit closure requirements (2-ft thick soil cover), woody vegetation was removed from the landfill and the existing soil cover was repaired.

The depth to groundwater at this site is ~150-220 ft in the bedrock. Water bearing zones are locally present above the water table (perched water).

The PA/SI for this site was conducted between 1987 and 1995. Five shallow wells (less than 30-ft deep) were installed in the overburden at FLW-002 during 1987 (USAEHA, 1988). Initially these wells were dry, however, 4 months later 2 wells had small amounts of water. Water from these 2 wells and 1 seep in the north central part of the site was sampled during 1988. Water samples from these wells were analyzed for inorganic constituents, volatile organics, semi volatile organics, pesticides, and PCBs. These water samples contained inorganic constituents that exceeded background concentrations.

During 1990, 3 bedrock-monitoring wells were installed at depths ranging from 83-100 feet (USAEHA 1990). Water samples from these wells were analyzed for inorganic constituents, volatile organics, semi volatile organics, pesticides, and PCBs. Water samples from these wells did not exceed background concentrations of inorganics.

The RI at this site began in 1997. During 1997, four (4) monitoring wells were completed to water table and one (1) monitoring well was completed in a perched water zone. There were traces of PCE and vinyl chloride below MCL in the water table wells. Sampling of the perched water indicated vinyl chloride above MCL and trace amounts of other chlorinated solvents.

Soil and sediment samples were collected from the surface of the landfill and from the dry streambeds near the landfill. No significant concentrations of inorganic constituents or organic compounds were detected. Soil gas samples from the surface of the landfill indicated the presence of PCE and other chlorinated solvents in the southeastern part of the site.

Since 1997, additional monitoring wells were installed to determine extent of contamination and groundwater flow direction at the site. The monitoring well sampling program ended in the fall of 2003. As of fall 2003, no contamination has been detected above MCLs in the groundwater (from 14 wells). A Draft RI/FS was submitted to MDNR in July 2004. Review of the draft RI/FS indicated additional fieldwork is needed to satisfy comments and complete the RI/FS. The additional field investigation will include an evaluation of cover material, one round of GW sampling, and any necessary sediment and surface soil sampling. A contract is underway for completion of the RI and a draft FS.

CLEANUP STRATEGY

A contract has been awarded for the RI and a draft FS. Completion of the FS/PP/DD will be included in the phase two PBC. It is anticipated remediation will not be necessary, although some cover repair is expected. Long term management (LTM) is anticipated. A thirty year groundwater monitoring program will be implemented and will consist of the sampling of eight wells semi annually for five years then annually for the remaining. Land use controls will be established for this site and will be coordinated with the installation master planner.

FLW-003
LANDFILL 3

SITE DESCRIPTION

FLW-003 is an 82-acre, inactive trench and fill sanitary landfill that operated between 1965 and 1978. It is located north of road FLW 30 and east of road FLW 1 approximately 0.75 miles southeast of Forney Air Field. The landfill was divided into a northern section (approximately 52 acres) and a southern section (approximately 30 acres) separated by an intermittent stream. The landfill was used for disposal of municipal waste generated at Ft. Leonard Wood. The surface of the landfill is vegetated with grass and brush. The northern section generally slopes north to south. The southern section slopes south to north. The landfill shows some surface subsidence and surface leachate seeps. The seeps are primarily on the slopes. Sludge from the Sewage Treatment Plant is applied to the surface to encourage vegetation. Leachate from the landfill appears to have impacted the groundwater quality. Clean fill is being spread on the landfill to make the site more accessible for land application of WWTP sludge under an MDNR permit and to improve drainage.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Medium

CONTAMINANTS OF CONCERN:
Chlorinated Solvents, Metals

MEDIA OF CONCERN:
Soil, Groundwater, Surface Water

Phases	Start	End
PA	198712	198807
SI	199411	199509
RI/FS	199803	200611
RD	200612	200704
RA(C)	200709	200808
LTM	200809	203809

RC DATE: 200808

The depth to groundwater at this site is approximately 200 to 280 feet, in the bedrock. Water bearing zones are locally present above the water table (perched water).

The PA/SI for this site was conducted between 1987 and 1995. Twelve shallow wells (less than 50-feet deep) were installed at FLW-003 during 1987 (USAEHA, 1988). Initially all of these wells were dry; however, 4 months later one well had small amounts of water. A water sample from this well was analyzed for inorganic constituents, volatile organics, semi volatile organics, pesticides, and PCBs. Inorganic constituents did not exceed background concentrations and no organic compounds were detected.

During 1990, four bedrock-monitoring wells were installed at depths ranging from 58 to 102 feet (USAEHA 1990). One well contained perched water. A water sample from this well was analyzed for inorganic constituents, volatile organics, semi volatile organics, pesticides, and PCBs. This sample contained inorganic constituents (chloride and barium) that exceeded background. No organic compounds were detected.

Soil, streambed sediments, and leachate seeps were sampled in 1995. Soil and streambed sediments were analyzed for inorganic constituents, pesticides, and PCBs. No significant concentrations of inorganic constituents or organic compounds were

detected. Leachate seeps and groundwater samples from two shallow wells were analyzed for inorganic constituents, Volatile Organic Compound (VOCs), Semi Volatile Organic Compound (SVOCs), and pesticides. Vinyl chloride and benzene were detected above MCL in the leachate samples. No organic compounds were detected in the groundwater samples.

The RI at this site began in 1998. During 1998 and 1999, twelve monitoring wells were completed to the water table and five monitoring wells were completed in perched water zones. At some locations, large voids, in excess of ten feet in vertical extent and undetermined horizontal extent, were encountered during drilling. Groundwater samples from these wells were analyzed for inorganic constituents, VOCs, SVOCs, and pesticides. These samples contained larger than background inorganic constituents. The sample analyses also included PCE and vinyl chloride in concentrations greater than MCL, and trace amounts of other chlorinated solvents.

In 2001, six (6) additional wells were added to the site. In 2002, a phytoremediation study was conducted on an approximately five (5) acre area of 'volunteer trees' in the landfill area and concluded that there was minimal uptake into the tree. During FY2004 one additional groundwater monitoring well was installed to further investigate perched groundwater and a dye trace was conducted to evaluate a void found while drilling this well. Clean fill continues to be spread on this site to make it more accessible for land application of sludge from the WWTP (under MDNR permit).

A Data Summary report was prepared in FY04. A contract for completion of an RI and draft FS report has been awarded and work is underway.

CLEANUP STRATEGY

A contract has been awarded for the RI and a draft FS. Completion of the FS/PP/DD will be included in the phase two PBC. Cover repairs are expected to be required on a periodic basis. LTM is anticipated to begin in FY07. A thirty year groundwater monitoring program will be implemented and will consist of the sampling of ten wells semi annually for five years then annually for the remaining time.

FLW-006
LANDFILL 4 BALLFIELD/RUNNING TRAIL

SITE DESCRIPTION

FLW 006 is a closed sanitary landfill that operated from an unknown initial date until 1950. It is located northeast of the intersection of Constitution and Kansas roads in the Cantonment. The landfill occupied 7.3 acres. Presently, the landfill is completely covered with vegetation and no exposed trash is evident.

Fort Leonard Wood conducted sampling of three leachate seeps, stream sediments, and surface water up and down gradient of the landfill during FY02 using non-IRP funding. Vinyl chloride was detected (1.2µg/l) in only one of the leachate samples from a wet weather seep. No groundwater samples have been taken. A Data Summary Report that summarized investigation results was submitted in FY05.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Low

CONTAMINANTS OF CONCERN:
Chlorinated Solvents, Metals

MEDIA OF CONCERN:
Soil, Sediment, Groundwater

Phases	Start	End
PA	198712	198807
SI	199712	200309
RI/FS	200609	200903
RD	200904	200909
RA(C)	200909	201009
LTM	201009	204010

RC DATE: 201009

CLEANUP STRATEGY

An RI/FS will be conducted to determine the nature and extent of contamination. This work is included in the phase one PBC expected to be awarded in August of 2006. A ten year groundwater monitoring program will be implemented and will consist of the sampling of three (3) wells semi annually for five years then annually for the remaining period.

FLW-008
LANDFILL 6 - ROSE BOWL

SITE DESCRIPTION

Landfill 6 is a closed sanitary landfill that operated between 1942 and 1950. The landfill is southeast of the veterinary office and southeast of the intersection of Minnesota Avenue and Gas Street. It occupies 7.5 acres. The area is now completely covered with vegetation. FLW also open burned waste and buried the residue in this landfill. USAEHA 1987-88 recommended no further action for this site. 1992 RFA noted no known contamination and noted the site was regulated by MDNR. Based on the USAEHA recommendations no data collection was conducted for this site.

During the FY05 IAP, MDNR indicated that an evaluation would be necessary for this site prior to being declared RC.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: NE

CONTAMINANTS OF CONCERN:
Chlorinated Solvents, Metals

MEDIA OF CONCERN:
Soil, Sediment, Groundwater

Phases	Start	End
PA	198712	198807
SI	198712	198807
RI/FS	200609	200909
IRA	198801	198802
LTM	201009	201609

RC DATE: 200909

CLEANUP STRATEGY

This site is included in the phase one PBC to be awarded in August 2006. The site will be evaluated and either an RI/FS or NFRAP will be prepared. It is expected, based on discussions with MDNR, that monitoring will be necessary for 10 yrs or 2 5-yr reviews. LTM will be included in the phase three PBC.

FLW-012
LANDFILL 10A (STP I)

SITE DESCRIPTION

FLW-012 has been reopened and all five STP landfills (FLW-012, FLW-013, FLW-014, FLW-015 and FLW-016) will be managed as one site due to proximity and similarity of these areas.

FLW-012, Landfill number 10A, is a closed sanitary landfill operated between 1960 and 1969. Household waste and the residue from the open burning of household waste were buried in this landfill. It is located southeast of road FLW A-B and north of Plant Road and occupies 2.8 acres. It is located on the edge of Dry Creek which is a losing stream that feeds Shanghai Spring. The depth of the landfill is unknown. It is covered with vegetation with no exposed debris. It is used for the land application of sewage treatment plant sludge.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Low

CONTAMINANTS OF CONCERN:
Chlorinated Solvents, Metals

MEDIA OF CONCERN:
Soil, Sediment, Groundwater

Phases	Start	End
PA	198712	198807
SI	199712	199812
RI/FS	200609	200909
RD	200909	201006
RA(C)	200909	201009
LTM	201009	204009

RC DATE: 201009

Surface water dye tracing, conducted in 1996 indicated that the landfill areas and Shanghai Spring are hydraulically connected. The Ft. Leonard Wood sewage treatment plant discharges downstream from the landfill areas. PCE has been detected in Shanghai Spring at levels below regulatory requirements. During rain events, the concentration of PCE in Shanghai Spring increases slightly indicating a source may exist in close proximity to the spring.

Based on funding limitations and RRSE, the installation pursued very limited investigation at FLW-012. Soil gas samples were taken during 1998 and tree-core samples were taken in 2003. During a data call in the 1990s all five STP landfills were incorrectly marked as RC in the IRP database.

A Data Summary Report that incorporates the historical data collected at the STP landfills was prepared in FY04.

CLEANUP STRATEGY

An RI/FS will be conducted to determine the nature and extent of contamination. This work is included in the phase one PBC expected to be awarded in August of 2006. A ten year groundwater monitoring program will be implemented and will consist of the sampling of five (5) wells semi annually for five years then annually for the remaining time.

FLW-028
DPW OLD FIRE TRAINING AREA

SITE DESCRIPTION

This fire training area was used to train Ft. Leonard Wood fire fighters between 1972 and 1988. The area is located in the central part of the facility, south of Forney Airfield and is roughly 100 feet by 400 feet. Training occurred twice a year and involved the ignition of approximately 150 gallons of aviation fuel for each exercise. A concrete pad with containment berms was used to contain the burning fuel. The pad has since been removed, leaving a flat vegetated area. The area is bermed on three sides with earth berms 6 feet high and 10 feet wide.

The fire training area was investigated in the "Sampling Visit" (USAEHA, 1990). Samples were taken at 2-3 1/2, 5-6 1/2, and 8-9 1/2 feet below the ground surface. All samples were analyzed for TCLP-metals, total petroleum hydrocarbon (TPH), volatile organics, and semi-volatile organics (USAEHA, 1990). Volatile organic analytical results indicated values reported for methylene chloride and acetone were 6-31 mg/kg and 13-75 mg/kg, respectively. Analysis for semi-volatile organics determined that isophorone was detected in one borehole at 850 ug/kg (2-3 1/2 feet), 2130 ug/kg (5-6 1/2 feet), and 250 ug/kg (8-9 1/2 feet). The USGS collected 25 samples within the bermed area in 1995; sample analyses show low levels of BTEX present.

The area was partially paved in the late 1990s and is currently used as a vehicle skid pad for MP training. It is located within the boundaries of an active training area, TA 210.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Low

CONTAMINANTS OF CONCERN:
BTEX, Organics

MEDIA OF CONCERN:
Surface Water, Soil, Groundwater

Phases	Start	End
PA	198712	198807
SI	199410	199509
RI/FS	200609	200909

RC DATE: 200910

CLEANUP STRATEGY

Sampling has indicated that there are low levels of BTEX contamination present; the RI will determine the nature and extent of the contamination. With the current, limited information, no further action is expected to be needed beyond the RI. The RI has been contracted for in the phase one PBC expected to be awarded in August 2006.

FLW-037
DEH OLD PESTICIDE STORAGE AREA BLDG 2206

SITE DESCRIPTION

The Old Pesticide Storage Area was in Bldg 2206 within the DPW compound in the east-central portion of the cantonment area. The building was used from 1966 until 1981 to mix and store pesticides. Pesticides and pesticide rinsate were stored in drums inside the building. The building did not have secondary containment. Some unused pesticide rinsate was reportedly disposed of on the ground at the northeast end of the building. Bldg 2206 had a concrete floor with a floor drain which was connected to the sanitary sewer system. The floor appeared to be in good condition at the time of the VSI. Since the building was used for this purpose before the regulation of pesticides, it is possible that some currently prohibited pesticides may have been used in Bldg 2206. The site was included in the "Sampling Visit" conducted in Sept 1990, in which 6 soil samples were taken to determine if a release has occurred to the soil. Further sampling by USGS during the Site Investigation confirmed contamination in the soils near the building and in an adjacent drainage. USGS also conducted building structure samples and analyzed for TCLP pesticides prior to its demolition and disposal. No contamination was found and the building debris was disposed of off-post in a sanitary landfill. MDNR sent a letter concurring with the final remediation report for the removal of the building and soil associated with the building. The site was designated as RC on the basis of MDNR's approval of the remediation report. Review of the available information indicated that a limited amount of sampling will satisfy the requirements for determining extent of any contamination. This field work was conducted in the fall of August 2005 and indicated limited and low level contamination at very shallow soil depths and within the sediments in the drainage for the area.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Medium

CONTAMINANTS OF CONCERN:
Pesticides

MEDIA OF CONCERN:
Surface Water, Soil, Groundwater

Phases	Start	End
PA	198712	198807
SI	199410	199509
RI/FS	199610	200909
IRA	199808	199911

RC DATE: 200909

CLEANUP STRATEGY

An IRA is planned to address the limited contamination and is planned to be part of the phase 1 PBC to be awarded in late FY06. Based on a cost comparison this is expected to be cheaper than long term management of the contaminated site.

FLW-056
FLW DRY CLEANING SHOP

SITE DESCRIPTION

FLW-056 is the site of a former dry cleaning and laundry facility (Building 2300) that was in operation from the mid 1940s until 1981. This site is approximately one-acre in size and is located at the southeast corner of the intersection of 1st Street and Louisiana Avenue. The building was demolished in 1987. The site is covered with grass and slopes slightly to the north. Prior to the 1970s, the facility used TCE and afterwards used PCE as a dry cleaning solvent.

The PA/SI was conducted between 1992 and 1999. A limited SI was done in FY97-98 to determine the potential for contamination and its migration to the ground water. Shallow (less than 3-feet deep) subsurface soil samples collected at the site contained large concentrations of PCE and TCE. Soil gas samples taken at the site contained PCE, TCE and other organic compounds. Samples from a nearby stream and storm sewer system contained PCE and TCE above MCLs.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: High

CONTAMINANTS OF CONCERN :
TCE, PCE

MEDIA OF CONCERN:
Surface Water, Soil, Groundwater

Phases	Start	End
PA	199202	199209
SI	199804	199908
RI/FS	199908	200609
RD	200609	200612
IRA	200109	200506
RA(C)	200609	200709
LTM	200709	201710

RC DATE: 200709

The RI at this site began in 1999. The RI was initiated because of PCE detected in the soils at the site and water from a nearby creek, and because PCE was detected in Shanghai Spring (located off the installation). Sample results from soil borings indicate PCE contamination to depths of at least 30-feet. Two monitoring wells were installed during 1999 and three additional wells in 2001. Samples from these wells indicate that PCE and TCE have migrated to the perched water zone (approximately 130-feet) and groundwater table (approximately 190-feet). An additional 3 wells were installed in 2003. Four additional monitoring wells were installed in FY2004.

In 2001 a pilot study was initiated to study the feasibility of an ex-situ chemical oxidation process. Additional on-site investigation results and results from a bench scale test were evaluated. A determination was made that the technology was not feasible at this site and in 2004, the study was canceled.

A performance based contract was awarded to CDM Federal in late FY04 for the completion of the RI/FS. The public comment period for the proposed plan has closed;

no comments were received. The decision document is being prepared and will be staffed for signature by USAEC during the summer of 2006.

A separate investigation of the adjacent Post Laundry facility, building 2352, conducted in Jan 2005, indicates that the existing dry cleaning operation may be a contributory source. Sampling of sediments in a storm drain leading from building 2353, and up gradient of FLW-056, found PCE at 4100 ppb. Soil gas sampling on the south side of the building also indicates possible soil contamination. This site is being managed separately as CCFLW-001 and is documented in the Compliance Cleanup IAP.

CLEANUP STRATEGY

The proposed plan recommended limited soil excavation and groundwater monitoring. Remedial design and action are expected during FY07 and will be included in the phase 1 PBC scheduled for award in August 2006. Land use controls will be captured in the Master Plan. Groundwater monitoring is expected to last 30 years; monitoring 9 wells.

FLW-059
MUNICIPAL LANDFILL ON SOUTH OF ROUBIDOUX

SITE DESCRIPTION

FLW-059 is a combination of three inactive municipal solid waste trench and fill landfills that were operated from 1958 until 1961. It is located in the northwestern corner of the Fort between Roubidoux Creek and Road FLW 8 on the Roubidoux Creek flood plain. The site is heavily vegetated with small trees and brush. The surface area is uneven and has standing water in the low areas. There is no exposed trash. The approximate boundaries of the landfill have been fenced; however, the actual boundaries of the landfill may extend beyond the fenced area. Signs have been placed around what is thought to be the boundaries to keep training activities from impacting landfill cover. A 1982 US Army Toxic and Hazardous Materials Agency (USATHAMA) report identified three landfills, landfills 15, 16, and 17. This site is listed as SWMU-049 in the 1992 RFA; however, the RFA erroneously located the site much further site on the north side of road FLW 20 near Forney Air Field. The photograph included in the 1992 RFA of SWMU 049 correlates to FLW-059.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Medium

CONTAMINANTS OF CONCERN:
Chlorinated Solvents, Inorganics

MEDIA OF CONCERN:
Surface Water, Soil, Groundwater

Phases	Start	End
PA	199410	199509
SI	199712	200403
RI/FS	200404	200712
RD	200810	200909
RA(C)	200909	201010
LTM	201010	204010

RC DATE: 201010

The PA/SI at this site began in 1982. In 1995 USGS collected soil and sediment samples which were tested for inorganic constituents, pesticides, and PCBs. The results indicated no significant contaminants; however, one sample contained elevated concentrations of zinc. In 1997, four temporary shallow (less than 20-feet) monitoring wells were installed. The results indicated inorganic constituents above background. VOCs were also detected. Groundwater flow was determined to be west-northwest towards the Roubidoux Creek. In FY2004 five groundwater-monitoring wells were installed. Initial groundwater sampling indicates there may be elevated concentrations of metals in one well. A geophysical investigation has been completed to define the extent of the landfill cells.

CLEANUP STRATEGY

An RI/FS is planned (phase 1 PBC) and an RD/RA (phase 3 PBC) may be needed for landfill cover repair and LUC implementation. LTM is anticipated. A ten year groundwater monitoring program will be implemented and will consist of the sampling of five (5) wells semi annually for five years then annually for the remaining years.

FLW-060
LANDFILL ON A BRANCH TO BIG PINEY

SITE DESCRIPTION

FLW-060 is an inactive municipal solid waste landfill with unknown dates of operation. It consists of approximately 10.5 acres, located on a side drainage to the Big Piney River, off of the East Gate Road.

The landfill was not mentioned in the 1982 Installation Assessment Report number 322. It was not identified in the subsequent USAEHA studies. MDNR has requested further investigation because of its proximity to the Big Piney River.

CLEANUP STRATEGY

An RI/FS will be conducted (phase 1 PBC). RD/RA and LTM phases are planned (phase 3 PBC). A ten year groundwater monitoring program will be implemented and will consist of the sampling of four (4) wells semi annually for five years then annually for the remaining time.

STATUS

REGULATORY DRIVER: CERCLA

RRSE: Medium

CONTAMINANTS OF CONCERN:
Household Waste

MEDIA OF CONCERN:
Surface Water, Soil, Groundwater

Phases	Start	End
PA	199410	199509
SI	199510	200403
RI/FS	200609	200909
RD	200810	200909
RA(C)	200909	201009
LTM	201010	204010

RC DATE: 201009

FLW-004
LANDFILL 3B (SOUTH WATER TOWER II)

This landfill site was redesignated as part of FLW-003 (Landfill No. 3A) during the October 2000 IAP Workshop. This was done because it was determined that this landfill was originally part of FLW-003 and should not have been designated as a separate site. FLW-004 will be carried in AEDB-R as Response Complete (RC).
All budgetary and cleanup requirements will be carried forward under FLW-003.

FLW-005
LANDFILL 3C (SOUTH WATER TOWER II)

This landfill site was redesignated as part of FLW-003 (Landfill No. 3A) during the October 2000 IAP Workshop. This was done because it was determined that this landfill was originally part of FLW-003 and should not have been designated as a separate site. FLW-005 will be carried in AEDB-R as Response Complete (RC).
All budgetary and cleanup requirements will be carried forward under FLW-003.

FLW-007
LANDFILL 5

Landfill 5 is a closed construction debris landfill that operated between 1942 and 1950. It is located south of First Street in the east central cantonment. The landfill occupied 6.9 acres. Presently, the landfill is partially covered with asphalt, fenced and serves as a secure enclosure for shipping containers. The unpaved portions are completely vegetated.

FLW-009
LANDFILL 7

Landfill 7 is a closed demolition landfill that was operated between 1942 and 1950. It is located southeast of Landfill 5 and south of First Street, and occupies .9 acres. It was used to dispose of construction debris and some household wastes. USAEHA 1987-88 recommended additional capping for this site. 1992 RFA noted no known contamination and noted the site was regulated by MDNR. Based on the USAEHA recommendations no data collection was conducted for this site. The area is now covered with vegetation.

FLW-010
LANDFILL 8 (HORSE STABLES I)

Landfill 8 is a closed demolition landfill that was operated between 1942 and 1980. It was used for open burning, with the residue being buried in this landfill. It is southeast of the intersection of roads FLW 8 and EE and occupies 11.4 acres. USAEHA 1987-88 recommended additional capping for this site. 1992 RFA noted no known contamination and noted the site was regulated by MDNR. Based on the USAEHA recommendations no data collection was conducted for this site. This site has been well covered, terraced and is completely vegetated. It is used for the land application of biosolids from the WWTP.

FLW-011
LANDFILL 9 (HORSE STABLES II)

Landfill 9 is a demolition landfill that was operated from 1950 to 1992. It is located south of FLW road 8, adjacent to Landfill 8. It was permitted under Missouri Department of Natural Resources permit #216901. Final cover has been applied and the site is completely vegetated. The closure plan for this landfill was approved by MDNR. Numerous MDNR inspections throughout the years have verified the efficacy of the post closure plan. This site has been well covered, terraced and is completely vegetated. It is used for the land application of biosolids from the WWTP.

FLW-013
LANDFILL 10B

This site was redesignated as part of the FLW-012 site during the 2005 IAP.
Landfill number 10B, is a closed sanitary landfill used between 1961 and 1969. It is north of the STP holding basin and southeast of Landfill Number 10A, at the end of Plant Road, and occupies 3.6 acres. It was used for the disposal of household waste, trees, and sludge from the STP. It is located on the edge of Dry Creek that feeds to Shanghai Spring. PCE has been detected in Shanghai Spring at levels below regulatory requirements. The source of the PCE has not been fully defined. During rain events, levels of PCE in Shanghai Spring increase indicating a source is close to the spring. The depth of the landfill is unknown. It is covered with vegetation (grasses and weeds), with no exposed debris. It is used for the land application of sewage treatment plant sludge.
Dye tracing, conducted in 1996 indicated that the landfill area and Shanghai Spring are hydraulically connected. The sewage treatment plant discharges downstream from the landfill area.

PA was completed in September 1992, Final RCRA Facility Assessment Report for Fort Leonard Wood. This report was based on a visual inspection and sampling was not conducted. Based on funding limitations and a low RRSE, the installation pursued very limited investigation at this site. Soil gas samples were taken during 1998 and tree-core samples were taken in 2003. During the 2003 IAP workshop, the installation representative and the State regulator agreed that further investigation might be warranted. A records search is currently contracted for this site in FY2004.
All budgetary and cleanup requirements will be carried forward under FLW-012.

FLW-014
LANDFILL 11A (STP III)

This site was redesignated as part of the FLW-012 site.
Landfill No. 11A is a closed sanitary landfill that operated between 1947 and 1957. It is north of Plant Road, near the STP, in the extreme northeast Cantonment Area and occupies 6.1 acres. Landfill No. 11A was used to dispose of household garbage. It is located on the edge of Dry Creek that feeds to Shanghai Spring. The depth of the landfill is unknown. It is covered with vegetation (grasses and weeds), with no exposed debris. It is used for the land application of sewage treatment plant sludge.
All budgetary and cleanup requirements will be carried forward under FLW-012.

FLW-015
LANDFILL 11B (STP IV)

This site was redesignated as part of the FLW-012 site.
Landfill No. 11B is a closed sanitary landfill that operated between 1957 and 1958. It is north of Plant Road in the extreme northeast Cantonment Area and occupies 2.0 acres. Landfill No. 11B is northeast of Landfill No. 11A, SWMU 43. The landfill was used to dispose of household garbage. It is located on the edge of Dry Creek that feeds to Shanghai Spring. The depth of the landfill is unknown. It is covered with vegetation (grasses and weeds), with no exposed debris. It is used for the land application of sewage treatment plant sludge.
All budgetary and cleanup requirements will be carried forward under FLW-012.

FLW-016
LANDFILL 11C (STP V)

This site was redesignated as part of the FLW-012 site.
Landfill No. 11C is a closed sanitary landfill that operated from 1960 for an unknown period of time. It is north of Plant Road near the STP, SWMU No. 26, northeast of Landfill 11B, SWMU No. 44. Landfill No. 11C occupies 6.1 acres. It is located on the

edge of Dry Creek that feeds to Shanghai Spring. The depth of the landfill is unknown. It is covered with vegetation (grasses and weeds), with no exposed debris. It is used for the land application of sewage treatment plant sludge.
All budgetary and cleanup requirements will be carried forward under FLW-012.

FLW-017
LANDFILL 12 (ROUBIDOUX I)

Landfill 12 is a closed sanitary landfill that operated between 1958 and 1961. It is in the northwest portion of FLW, near Roubidoux Creek and occupies 7 acres. The landfill is adequately covered with vegetation and has no exposed debris. The landfill has been covered during construction of Polla Rd (West Gate Rd). Cover depth of ~50' on the north side and 5' on the south side. Geotechnical borings for the road construction showed no significant contamination.

FLW-018
LANDFILL 13

Landfill 13 is a closed demolition landfill that operated between 1960 and 1970. It is south of TA 294, near the intersection of FLW 20 and FLW 5, and occupies 1.4 acres. It was used for disposal of demolition and construction debris. It is adequately vegetated, and has some areas of subsidence. USAEHA 1987-88 recommended no further action for this site. 1992 RFA noted no known contamination and noted the site was regulated by MDNR. Based on the USAEHA recommendations no data collection was conducted for this site.

FLW-019
LANDFILL 14

Landfill 14 is a closed demolition landfill operated from an unknown initial date to the late 1950s. It is east of Gas Street in the present DRMO operational area, and occupies 9.5 acres. The area is now used for a salvage yard and storage area. The PA/SI conducted by USAEHA revealed no contamination. USAEHA 1987-88 recommended no further action for this site. RFA report issued by USEPA following the 9/10/91 VSI recommended no further action. 1992 RFA noted no known contamination and noted the site was regulated by MDNR. Based on the USAEHA recommendations no data collection was conducted for this site.

FLW-020
LANDFILL 15 (HEAT RECOVERY INCINERATOR)

Landfill 15, is a closed sanitary landfill. It is west of road FLW 1 and north of road FLW P, and occupies 37 acres. It was in operation from 1985 to 1994 and operated under permit #116909. It received incinerator ash from the hospital, veterinary, and heat recovery incinerators, and household waste and demolition debris. It no longer receives waste and has been closed. The storm-water permit requires quarterly monitoring for criteria pollutants. MDNR has approved and continues to monitor the post-closure plan for this landfill.

FLW-021
MEDICAL WASTE INCINERATOR

The incinerator was in the east dock area of Building 310. The incinerator was used to dispose of medical and infectious wastes generated at the hospital at a rate of 12 pounds per 35 minutes. It was in operation since 1983 and was operated until 1990 under MDNR permit number 0278-008. An updated incinerator was installed in 1990 with a capacity of 139 lbs per hour and was operated under MDNR permit number 0590-004. Stack test data is on file in the Environmental Office. The ash was tested every 6 months for TCLP, and was sent off-post to a sanitary landfill. It was located in a closed secured building. The incinerator was taken out of operation and closed in the early 1990s.

FLW-022
VET LAB INCINERATOR

The FLW veterinary clinic is in Building 2399. The clinic generated animal and laboratory wastes that were disposed of in an incinerator located in the clinic. The incinerator operated under MDNR Permit No. 0983-019 and was not continuously operating. Approximately 55 gallons of waste were burned once a week. The incinerator was put into operation in 1984 and shut down in 1993. There were no emission controls on the incinerator. The ash from the incinerator was tested in 1990 and passed the TCLP. Ash was disposed of in the post sanitary landfill. Because the incinerator did not meet new incinerator regulations, it was shut down and decommissioned in June 1993. It has been removed from the building.

FLW-023
BOILER PLANT BUILDING 663

This was a municipal solid waste incinerator and heat recovery unit with a rated capacity of 75 tons per day, which normally operated at a rate of 35 tons per day. It was located in building 663 and was decommissioned in 1991. The plant went into operation in 1980, and was used to incinerate solid waste from the post. Used oil was used as a secondary fuel. Ash was disposed of in sanitary landfill 15, FLW-020. The plant was shut down due to new Clean Air Act Amendment requirements. The plant was converted to a transfer station in 1991 and is permitted under MDNR permit number 416901. It is not currently used as a transfer station; however, the permit is maintained for future contingencies.

FLW-024
SEWAGE TREATMENT PLANT

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

This sewage plant is located in the northeast corner of the cantonment, on Plant Road. It has been in operation since 1940 and is currently operated by the post operations contractor. It treats approximately 3.5 MGD of domestic sewage. It is composed of bar screens, grit chamber, two primary clarifiers, four high rate trickling filters, two secondary clarifiers, four anthracite/sand filters, chlorine contact basin, and two anaerobic digesters. Discharge is into Dry Creek, which in turn flows into the Big Piney River. The discharge is covered by NPDES permit #MO-0029742. Sludge from the plant is land applied on Fort Leonard Wood.

FLW-025
WATER TREATMENT PLANT LAGOON

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

The Water Treatment Plant Lagoon is located 400 feet south of the plant and occupies 250,000 square feet. Wastewater from back washing the sand filters at the plant is discharged into the lagoon. The lagoon has operated since 1941, and discharges into the Big Piney River at a rate of approximately 135,000 gpd. It operates under MDNR Permit No. MO-0058068.

FLW-026
SEWAGE TREATMENT PLANT LAGOON SITE

The Sewage Treatment Plant Lagoon was 0.35 acres in size and located 700 feet northeast of the plant. It was used to hold digester waste from 1967 to 1986. Remediation took place under the supervision of the Kansas City District Corps of Engineers and consisted of sludge removal. Sludge was taken to landfills 10A, 10B, 11A, 11B, and 11C (FLW-012 thru FLW-016). The location of the former lagoon is a vegetated field east of the stormwater overflow basin.

FLW-027
TRAINING AREA 244 SEWAGE LAGOONS

Two sewage lagoons, 100 by 125 feet in size, were used to treat sewage from buildings in the training area. Effluent flowed to a tributary to Roubidoux Creek, and was regulated under NPDES permit MO-0029751. The lagoons were bermed to prevent spillage.
RFA issued by EPA following the 9/10/91 VSI recommended no further action. The lagoon has since been drained, the sludge solidified or removed, and the sides pushed in.

FLW-029
NEW FIRE TRAINING AREA

This site is still in operation, and therefore is not eligible for IRP funds.
The new fire training area is the current fire training area. It has been in operation since 1988. It is north of the old fire training area, FLW-028, and is roughly 100 by 400 feet. Aviation fuel (150 gallons) is ignited twice a year as fire fighting training. The fuel is contained in a concrete pad with secondary containment measures. The concrete pad appears to be in good condition. The entire area is surrounded by earth berms 6 feet high and 10 feet wide. A 10,000-gallon aboveground storage tank is also located on the site to store aviation fuel. Fifty-five gallon drums shown in the photograph in the RCRA Facility Assessment were used to store fuel products.
RFA issued by USEPA following the 9/10/91 VSI recommended that no further action be taken.

FLW-030
OLD EOD OB/OD AREA RANGE 24

A small portion of Range 24 was used as an OB/OD area from an unknown time to 1976. The area is located in the south part of the facility, south of road FLW D and west

of road FLW 1, and according to description of unknown origin, occupied 2,700 square feet. The area was used for the destruction of excess or unusable munitions. The OB/OD pit is not distinguishable because of extensive range use at present. Range 24 is poorly vegetated because of active range exercises.
Soil sampling was planned by USAEHA in 1990, but the range was in use and not subject to RCRA requirements. It was not a permitted TSD facility. The area will continue to be used as a multipurpose range.
Sediment from nearby drainage areas, area seep and spring sampling done by USGS in 1995 revealed no contamination.

FLW-031
CURRENT EOD OB/OD AREA RANGE 36

Range 36 is currently used to open detonate (OD) waste munitions and explosives. Open burning (OB) is no longer conducted at the FLW facility and was discontinued in 1988. The OD/OB pits are L-shaped pits approximately 3 ft deep, occupying 1,000 square ft. The pits are earthen pits constructed simply by excavation of soil. It is north of road FLW W in the western portion of the FLW facility. The site has been operational since 1976. The OB pit is still visible and is separate from the OD pit by several hundred yards. Diesel fuel and other flammable petroleum-based fuels were added to the waste munitions during previous OB operations to ensure complete combustion.
Soil samples were taken from the OB pit and OD pit by FLW DPW personnel in November 1988. Soil samples were analyzed for volatile organics using EPA Method 8240. However, analytes were detected in the blank. It is not known why these analytes were detected in the blank. A figure indicating the soil sampling locations was not available at the time of the RFA. The wells at this location were sampled by USGS in 1995 and no contamination was found. A final RCRA closure of the site has been granted by MDNR. Range 36 will continue to be used for training.

FLW-032
CANNON (RANGE) ANG OB AND BURIAL SITE

Air National Guard personnel collected dud bombs from the bombing range and put them in an open pit, added fuel oil and burned them. The pit is approximately 4 feet deep by 6 feet wide and 100 feet long. OB took place semi-annually between 1982 and 1988 to destroy the duds. After OB, the bombs were buried in a burial pit 100 yards west of the OB pit. Samples were taken by USAEHA at six surface locations in the pit. The samples were tested for TCLP-Metals and explosives (RDX, HMX, 2,4,6-trinitrotoluene (TNT), 2,6-dinitrotoluene (2,6-DNT), 2,4-dinitrotoluene (2,4-DNT)).

Analysis for TCLP-metals determined that all samples had metals content below each metals' individual detection limit. Analysis for explosives determined that no explosives were detected above their individual detection limit (USAEHA, 1990). The burial site may possibly have live munitions buried at the site. For this reason, sampling activities were not undertaken at the burial site.
Sampling of area soils, sediments, and spring water taken during the Site Investigation found no contamination.

FLW-033A-033K
WASTE (USED) OIL USTs

FLW-033A, UST Bldg 663, 601, 2502, 2550 Used Oil - These were removed and not replaced.
FLW-033B, AST Bldg 777, 170, 1390 Used Oil. These tanks have secondary containment.
FLW-033C, AST Bldg 875, Used Oil
FLW-033D, AST Bldg 1383, 2581, 2250, 2212, Used Oil
FLW-033F, UST Bldg 2502, 5069, 5053, 950, Used Oil
FLW-033G, UST Build 2553 Used Oil Tank 500 Gal
FLW-033H, UST Bldg 4050, 4060 Used Oil
FLW-033I, UST Build 5071 Used Oil Tank 1,000 Gal
FLW-033J, UST Build 5071 Used Oil Tank 500 Gal
FLW-033K, UST Building 5074 (4 Tanks)
The USTs were removed and closed in accordance with MDNR closure guidance. These tanks were replaced with ASTs. Remaining USTs have been upgraded to meet all state requirements.

FLW-034
ASTs @ 600MP, 900MP, 1390

Eleven used oil and used fuel ASTs were investigated during the VSI. The location, tank contents, tank capacity, installation date, removal date, material of construction, origin of waste, Roll No., and Photograph No. for each tank is presented in Table 4-5 of the RFA report. AST locations are plotted on Figures 4-1 through 4-7 of the RFA report.
RA was completed on those tanks at which EPA reported spillage. Work completed on Service Order # 06527, 06530, and 05788.

FLW-035
DEH USED TRANSFORMER AREA 2222, 2221

The DPW used transformer storage area was between Buildings 2221 and 2222. This area was used for storage of transformers containing non-PCB oil. Transformers that contain PCB transformer oil are stored in Building 2398. Transformers awaiting analysis to determine if they contain PCBs are also stored in Building 2398. After an analysis determines that a transformer does not contain PCBs, the transformer is placed in a drip pan and transported. PCB-containing transformers are ultimately disposed of through the FLW hazardous waste disposal contractor.

FLW-036
DEH HAZARDOUS WASTE STORAGE AREA BLDG 2229

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

Building 2229 is located in the DPW area in the west-central Cantonment Area. DPW personnel constructed the facility in 1984 to store hazardous wastes until disposal by hazardous waste disposal contractors. Arrangements for disposal are made by the DRMO. This building is the FLW less-than-90-day storage area. The building is a secured, metal-sided building with a sealed concrete floor. The inside of the building is bermed to prevent spills from migrating outside the building. It is approximately 40 feet wide and 60 feet long, and is equipped with explosion proof lighting.

Adjacent to Building 2229 is a temporary hazardous waste storage building, designated 2229B, that was specifically designated to store flammable hazardous waste. The building has three separate fireproof compartments to prevent incompatible wastes from coming into contact with each other. Waste flammable liquids and waste corrosive liquids are stored in this building. Each compartment is approximately 8 x 10 feet long. Each of the three fireproof compartments opens to the outside with a locking metal door. The facility is currently in use.

FLW-038
DOL WASTE BATTERY ELECTROLYTE STORAGE AREA

The old acid storage area was outside behind Building 2563, now a shipping and receiving facility, as shown on Figure 4-3 of the RFA. Waste sulfuric acid, drained from used lead acid batteries, was stored outside directly on the ground in plastic drums

while awaiting disposal from an unknown date until January 1987. Waste acid was generated at FLW at a rate of 200 gallons per month. Up to 1,500 gallons of sulfuric acid was stored at this location. The site was surrounded by a trench and berms as secondary containment, but the site has been covered with crushed rock and re-graded. In addition, waste dry cleaning solvent (tetrachloroethylene) was also stored at this location awaiting off-site disposal. Low levels of contamination were found during the Multi-Site RCRA Investigation conducted by Radian Corporation in reported in June 1993. It is possible that it was caused by lab contaminants.

FLW-039
DRMO SCRAP YARD

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

The site occupies 9.5 acres on the northeast corner of the cantonment near Building 2391, on Gas Street. The site serves as a temporary storage yard for excess material and property awaiting sale by DRMO personnel. The items stored at the DRMO scrap yard are recyclable or reusable.

FLW-040
AMMUNITION CONTAINER STORAGE AREA

The ammunition container storage area is used to store used ammunition containers at a 3-acre ammunition supply point. Used ammunition containers are constructed of wood, some of which had been treated with pentachlorophenol (PCP). PCP-treated containers were stored outside on the edge of a concrete pad. The concrete pad is approximately 75 x 100 feet long. The pad appears to be in good condition. No cracks or staining were visible on the pad. The container pad is not covered or surrounded by berms to prevent release. The ammunition supply point is south of road FLW 36 on road FLW 15. FLW is currently not receiving any additional PCP treated containers. The storage area has been operational since 1981. PCP-treated containers had been stored at this location since 1985, but have been shipped off-site for disposal via DRMO.

No contamination has been found.

FLW-041
SAINT LOUIS ORDNANCE PLANT

This site is not in AEDB-R. The property has since been transferred to the 89th Reserve Support Command.

It is located in the northwestern border of the city of St. Louis, Missouri, where it joins St. Louis County. Most of the installation is located within the corporate limits of the city

of St. Louis. SLOP began production in 1942 and was used for the production of small arms ammunition and 105 mm shells. It was used until 1969 for ordnance production, but subsequent use has been made of a portion of the installation for explosive production through lease to private industry. The original installation occupied 279.5 acres but Fort Leonard Wood is current owner of 14.7 acres known as the Hanley Area. Details of the plant and investigations are at the Environmental Office in a USATHAMA report titled St. Louis Ordnance Plant Environmental Study. This property was transferred in FY97 to the 89TH Reserve Support Command.
A Survey of Hazardous/Chemical Area number 2 was conducted by USATHAMA in 1981. Contamination survey was done by USATHAMA in 1991.

FLW-042
60 ABANDONED USTs (from Demolished Bldgs)

Heating oil tanks were abandoned when the World War II buildings were demolished. The buildings were located through out the cantonment.
Tanks and visible contamination were removed. There is no state closure requirement for heating oil tanks.

FLW-043
WWII BUILDINGS (152) (DEMOLITION)

This was considered to be a site when building demolition was still considered ER,A eligible. However, BD/DR is not eligible for funding under DERA.

FLW-044
OLD BATTERY SHOP, BLDG 2563

The old battery shop was in a small room in Building 2563, now a shipping and receiving facility, as shown on Figure 4-3 in the RFA report. The old battery shop room is approximately 30 feet by 30 feet and was used from 1983 to 1987. The current battery shop is now located in the DOL maintenance shop in Building 5265. The only interim status storage area, this unit ceased acceptance of waste in 1981, when the storage of waste was commenced in an outside area. Formal RCRA closure has been completed. Listed as SWMU 14 in RFA.
The building also had a leaking UST associated with it for heating fuel. The tank was removed and a site assessment was done and contaminated soil was removed. The first cleanup done in accordance with the amounts of soil identified by the site assessment was not adequate. More money was then requested to complete the removal. The UST was not associated with the Part A permitted facility so the cleanup was eligible for ER,A funds.

FLW-045
6 UST (LEAKING) NEAR BUILDING 810

Heating fuel tanks associated with this building were found to be leaking. A site assessment was done and the tanks removed. All contaminated soil was removed and the site was closed in accordance with state closure requirements.

FLW-046 BLDG 2291 - SOIL ASPHALT STORAGE AREA (DPW STORAGE YARD)

The DPW salvage yard is in the DPW portion of FLW in the west-central portion of the Cantonment Area, as shown on Figure 4-5 of the RFA report. The salvage yard is an inactive facility that contains unused dumpsters, scrap metal, waste wood chips, and unused containers of chlorofluorocarbons used as refrigerants. The salvage yard also contained nine ASTs, which were used to hold used oil from the various motor pools at the FLW facility. These tanks are no longer in use. A concrete trench extended from the tanks to an oil/water separator. The oil/water separator was a concrete basin designed to separate oil and water by differences in density. In addition, there were drums of waste oil in an outside storage area stored directly on the ground in several locations at the DPW Salvage Yard, (as shown in Roll No. 1, Photograph No. 19 through 25 (Appendix A) of the RFA report). It is estimated that use of the salvage yard began in the 1960s.
Only the portion of the site related to the cleanup of the oil water separator and storage tanks is NFA.

FLW-047
FLW DEVICE SHOP

The FLW Device Shop was in Building 1448 in the Cantonment Area. Activities within the shop that generated hazardous waste were the use of paint thinners and solvents used in plastic molding. Wastes were accumulated in 5-gallon containers inside the building. Hazardous wastes were generated at approximately 5 gallons per month and disposed of through hazardous waste contractor. The building is currently used for training and activities there do not currently generate hazardous waste.

FLW-048
BOILER UST @ 311, 745, 1021, 675 (REMOVAL)

Number 6 heating oil tanks were abandoned when the boiler plants were fitted to burn natural gas. The tank 1 and 2 are located at building 645, tanks 3 and 4 are located at building 311, and tanks 5, 6, 7, and 8 are located at building 745. The tanks have been removed, the contamination removed, and the tank sites closed in accordance with state regulations for underground tanks.

FLW-049
DOL MAINTENANCE SHOP

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

The Directorate of Logistics maintenance shop is in Building 5265 in the Cantonment Area, as shown on Figure 4-6 in the RFA report. Within the maintenance shop are five operations that generate hazardous wastes: a battery shop, paint and body shop, furniture repair shop, glass bead blasting, and arc welding. The DOL maintenance shop has been in operation since 1987.

The battery repair shop, formerly in Building 2563, handles lead acid batteries. The FLW paint and body shop generates waste paint and solvents used to repair and paint motor vehicles. These wastes are accumulated in satellite accumulation areas awaiting disposal through hazardous wastes disposal contractors. Within the FLW paint and body shop, glass bead blasting operations used to remove paint from vehicles, also generates hazardous wastes. Waste glass beads are accumulated in 55-gallon drums.

After accumulation, the drum containing the waste beads is stored in Building 2229 awaiting disposal. Waste glass beads, generated at 120 gallons per month, are above TCLP limits for lead. The lead is generated from the paint removed from the vehicles. The glass bead wastes are disposed of as a hazardous waste by the DRMO. Furniture repair and stripping generate hazardous waste solvents. Waste solvents are collected in 55-gallon drums, then are disposed of by hazardous waste contractors. Waste arc welding flux generated from welding operations is above TCLP limits for lead. Waste flux is stored in 55-gallon containers awaiting disposal by hazardous waste contractors.

Waste flux is generated at 120 gallons per year and collected in filter fabric bags inside the glass bead blasting device. Hazardous waste contractors remove waste from the shop approximately once a month.

FLW-050
ROLL DENTAL CLINIC

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

The Roll Dental Clinic generated silver solutions from x-rays taken at the clinic, and other medicinal wastes. All x-rays now use a digital process. The silver solutions were taken to the FLW Community Hospital for silver recovery; while medicinal wastes are picked up for disposal by a licensed contractor. Roll Dental Clinic is located west of Nebraska Avenue. Waste mercury solutions are also generated at the clinic. Mercury solutions are accumulated up to 5 gallons in separate containers. Wastes are then stored in Building 2229 awaiting off-site disposal.

FLW-051
FLW COMMUNITY HOSPITAL

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

The hospital is in Building 310. Xylene waste from the hospital laboratory and out-of-date pharmaceuticals are piped to and stored in the basement. Waste Xylene is disposed of through a hazardous waste contractor. Silver waste solutions from x-rays and photographs are also stored in the basement. The storage area in the basement is a secured room used only for storage of waste. The room is approximately 15 by 25, and has no secondary containment. In addition, a silver recovery unit is operated in the basement in which silver is precipitated from solution. The silver is reclaimed as a precious metal via DRMO and the supernate goes to the sewer.

FLW-052
WATER TREATMENT PLANT

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

The plant is located in building 1601. The plant processes 3 million gallons per day. 95% of the water processed is taken from the Big Piney River, with the balance coming from a deep well. It has been in operation since 1941. Backwash from the plant goes to the lagoon FLW-025.

FLW-053
OLD FIRE TRAINING AREA AT LANDFILL 3

This area was used from 1972 to 1977. It is located in the southern part of the cantonment, and consisted of a 3 foot deep by 30 foot round pond. It is not known if the area had secondary containment. There was no closure done. Sampling was done by AEHA and no contamination was found. The site was identified after the VSI, and was therefore not visited by EPA.

FLW-054
OLD FIRE TRAINING AREA RUNWAY END

This area was used from 1964 to 1977. It is located in the southern part of the cantonment, but its actual size is not known. It is not known if the area had secondary containment. There was no closure done. Sampling was done by AEHA and no contamination was found. The site was identified after the VSI, and was therefore not visited by EPA.

FLW-055
OLD FIRE TRAINING AREA BALL FIELD

This area was used from 1952 to 1964. It is located in the cantonment, but its actual size is not known. The area reportedly had secondary containment. There was no closure done. Sampling was done by AEHA and no contamination was found. The site was identified after the VSI, and was therefore not visited by EPA.

FLW-057
ENTOMOLOGY LABORATORY

This site is still in operation, has no known releases, and therefore is not eligible for IRP funds.

The entomology laboratory is in the west-central portion of the Cantonment Area. The entomology lab has been in use since 1981. The laboratory is inside on a concrete floor approximately 50 feet long and 40 feet wide. The Entomology Lab at FLW generates spent carbon and rinseates contaminated with pesticide. Pesticides used at the FLW facility are mixed in the laboratory before application. Rinseates are treated in an activated carbon adsorption system before storage and disposal. Pesticide products encountered in Building 2273 are listed in Appendix B of the RFA report. Approximately one 55-gallon drum of spent carbon was stored in the entomology lab at the time of the VSI.

FLW-058
USTS 990 MOTOR POOL

The motor pool area, built in 1943, currently in use, had 2 regulated diesel underground tanks. It underwent a renovation in order to service the new Motor Transport Operators Course (MTOC). During the investigation for the MTOC renovation, some soil gas work was done which showed potential for contamination. The tanks were removed and a site assessment done. Tank and piping leaks were found.

UST Tanks have been removed, site assessment completed.

Initiation of IRP: 1985

Past Phase Completion Milestones

1992
• FLW-045 Building 810: Leaking UST was removed, site assessment completed and contamination removed
• FLW-058 Building. 990: Leaking USTs were removed, site assessment completed and contamination removed

1993
• FLW-033A Waste oil tank removals
• FLW-042 60 TANKS: Tanks and contaminated soil were removed after being abandoned during building demolition
• FLW-044 Building 2563: Leaking UST was removed, site assessment completed and contamination removed

1995
• FLW-046 Building 2291: Leaking tanks removed, site assessment completed, and contamination removed
• FLW-048 Boiler plant buildings: Abandoned USTs removed, site assessments completed, and contamination removed

Projected Record of Decision (ROD)/Decision Document (DD) Approval Dates:
2006
It is expected that the DD for FLW-056 will be signed in late FY06.

Schedule for Next Five-Year Review:
It is expected that the first five-year review will be due in 2011, based on the DD for FLW-056.

Estimated Completion Date of IRP (including LTM phase): 2040

FORT LEONARD WOOD IRP SCHEDULE

(Based on current funding constraints)

AEDB-R #	Phase	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
FLW-001	LTM									201909
FLW-002	RI/FS									
	RD									
	RA(C)									
	LTM									203808
FLW-003	RI/FS									
	RD									
	RA(C)									
	LTM									203809
FLW-006	RD				-					
	RA(C)				-					
	LTM									204010
FLW-008	LTM									201609
FLW-012	RI/FS				-					
	RD				-					
	RA				-					
	LTM									204009
FLW-056	LTM									201710
FLW-059	RD	-								
	RA		-							
	LTM									204010
FLW-060	RD				-					
	RA				-					
	LTM									204010
PBC at FLW	RI/FS									

Prior Years Funds

Total Funding up to FY04: $13,145K

Year	Site Information	Expenditures	FY Total
FY05			$ 1,590K

Total Prior Year Funds: **$1,590K**

Current Year (FY06) Requirements

Site Information	Requirements	FY Total
		$325K

Total Future Requirements: **$27,962K**

FORT LEONARD WOOD

Military Munitions Response Program

MMRP Summary

Total AEDB-R MMRP Sites/AEDB-R sites with Response Complete: 6/0

AEDB-R Site Types

3 Small Arms Range 3 Unexploded Munitions/Ordnance

Most Widespread Contaminants of Concern: Arsenic, Lead, OE

Media of Concern: Soil

Completed REM/IRA/RA: None

Total MMRP Funding

Prior years (up to FY05):	$ 25,000
Current Year (FY06):	$ 415,000
Future Requirements (FY07+):	$10,171,000
Total:	$10,611,000

Duration of MMRP

Year of MMRP Inception: 2003
Year of MMRP RIP/RC: 2013
Year of MMRP Completion Including LTM: 2044

MMRP Contamination Assessment

MMRP Contamination Assessment Overview

The US Army Environmental Center (USAEC) prepared cost-to-complete (CTC) estimates for all MMRP sites on active Army installations using available information for each MMRP site. The historical use and range description were used, where possible, to determine which Remedial Action and Cost Engineering Requirements (RACER) technologies were applicable to each site. Data was taken from the installations "Final Closed, Transferred, and Transferring (CTT) Range/Site Inventory Report."

Inventory data relevant to calculating the CTC in the RACER model are: site size, historical use, munitions type, soil type, topography, vegetation, restrictions, public access, groundwater depth, unexploded ordnance (UXO) density, range description, and range comments.

In general, limited information is available for MMRP sites since the range inventory report for each installation is considered the Preliminary Assessment. Each site's CTC estimate was calculated using one of four generic scenarios, unless additional and more site-specific information regarding the site was known. In these cases, the generic scenarios and assumptions were modified with site-specific information and the rationale for these modifications was documented. The four general scenarios are:

A) Small Arms Ranges and Sites – Ranges where only expended small arms are expected. Small arms ranges typically do not have UXO and only munitions constituents (MC) technology models are used for estimating costs.

B) Multi-use Ranges and Sites – Ranges or sites that potentially contain one or multiple types of UXO or discarded military munitions (DMM), as well as the potential for soil contamination with MCs. For these sites, munitions and explosives of concern (MEC) technologies in RACER, as well as MC technologies in RACER, are included in the estimate.

C) Multi-use Ranges and Sites with the Potential for Groundwater Contamination – These are multi-use sites where groundwater remediation would potentially be required. In addition to the technologies for MEC and MC, RACER technologies for groundwater treatment are included for these sites.

D) Buried Chemical Munitions (BCM) Sites – The USAEC recently completed an independent inventory of BCM sites at active Army installations. As a result of that inventory, 19 MMRP sites were identified as potentially containing BCM. Due to the unique procedures for dealing with BCM-contaminated sites, the scenarios A, B, and C and associated assumptions were inadequate to address the cost of investigating and restoring BCM sites. As a result, site-specific engineering estimates, utilizing both RACER and historic BCM costs, were generated for these sites.

There were three (3) Small Arms Ranges, and three (3) Multi-Use Ranges identified during the MMRP range inventory. It is not known at this time if off-post contamination exists at any of the identified sites.

MMRP Cleanup Exit Strategy

Small Arms Range: Army and DoD experience indicates that contamination on small arms ranges is primarily lead in soils and that remediation of these sites would primarily consist of excavation, off-site transportation, stabilization, and disposal. No MEC components would be expected at small arms ranges; therefore, they are not included in the estimate. Although the types of small arms ranges and patterns of contamination can vary, assumptions for this CTC estimate were based on the characteristics of a typical pistol and/or rifle MMRP range.

The following phases will be conducted for all Small Arms Ranges:

- Historical Records Review
- SI
- RI/FS
- RD
- Remediation of soil

Multi-Use Ranges: A Multi-Use Site is a range or site where UXO or DMM is potentially present. A MEC removal action, in addition to remediation of MC, is potentially required. The following phases will be conducted for all Multi-Use Ranges:

- HRR
- SI
- RI/FS
- RD
- Remediation (UXO & DMM)
- Institutional Controls
- Monitoring

2003

- Final US Army Closed, Transferring, and Transferred Range/Site Inventory for Fort Leonard Wood, Missouri, Engineering-Environmental Management, Inc. December

FORT LEONARD WOOD

Military Munitions Response Program

Site Descriptions

FTLWD-001-R-01
50-ACRE SITE, PARCEL 8

SITE DESCRIPTION

This 50-acre site is located on the southwest property boundary of Parcel 8 of Fort Leonard Wood and is owned by Fort Leonard Wood. The site is located in the Mark Twain National Forest and is undeveloped. A November 2000 document entitled "Survey and Remediation Plan for 50-acre Portion of Parcel Number 8" indicates that fragments associated with 37 mm sub-caliber projectiles, a possible target, and a large fragment from a 105 mm high explosive (HE) munitions were discovered during a surface inspection conducted by the Rock Island U.S. Army Corps of Engineers. The period of use for the range could not be determined. The November 2000 survey is the last document the inventory team located regarding the property.

A review committee for proposed transferred property met on 24 February 2000. The meeting was intended to discuss past and present training activities on the properties proposed for transfer, and a risk assessment code (RAC) worksheet for the 50-acre site was completed by the committee. The RAC sheet completed by the committee identified the following munitions, pyrotechnics, explosives and chemical warfare materiel as being used at the 50-acre site: Medium/large caliber ordnances (20 mm or larger); Bombs, practice (w/spotting chares); Practice grenades (w/spotting charges); complete and expended small arms (.22 cal - .50 cal), munitions containing a flame or incendiary material, flares, signals, simulators, screening smoke; primary and secondary explosives, practice landmines with spotting charges, dynamite and less sensitive explosives, and riot control agents.

Please note that it was determined during the Findings and Determination of Eligibility (FDE) for FUDS that this property should be re-designated as closed because the site could not be transferred due to potential MEC contamination. Reference Fort Leonard Wood FDE Report dated December 2004.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 1 **-** High

CONTAMINANTS OF CONCERN:
Lead, Arsenic, OE

MEDIA OF CONCERN:
Soil

Phases	Start	End
PA	200306	200312
SI	200601	200712
RI/FS	200910	201009
RD	201010	201109
RA(C)	201010	201209
LTM	201410	204409

RC DATE: 201209

CLEANUP STRATEGY

Additional RI is planned. RA, including waste removal, may be needed.

FTLWD-002-R-01
CENTRAL GRENADE RANGE

SITE DESCRIPTION

The Central Grenade Range encompasses 52 acres and is located in the central portion of the post. Fort Leonard Wood personnel could not provide exact years of use; however, they speculate that it was used during the Korean War era, or immediate post-Korean War for hand grenade training. It is known that this portion of the post was used during this period for training activities. A new ECS 66 building was constructed on the range in 1990-91. No documentation could be obtained during the site visit, which identified pre-construction surveys that may have been conducted.

CLEANUP STRATEGY

Complete the SI.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 3 - Moderate

CONTAMINANTS OF CONCERN:
Lead, Arsenic, OE

MEDIA OF CONCERN:
Soil

Phases	Start	End
PA	200306	200312
SI	200601	200712

RC DATE: 200712

FTLWD-003-R-01
MACHINE GUN RANGE

SITE DESCRIPTION

This site has been recommended for FUDS, Findings and Determination of Eligibility (FDE) Task 2.

Information regarding this site was limited; however, the area appears to encompass approximately 780 acres. The site is located off of the eastern boundary of the post, east of the central section of the cantonment area. The firing points appear to be located on the southern portion of the range with the firing direction towards the northwest based on a 1970s map identifying the former range; however, this could not be confirmed. Fort Leonard Wood personnel believe the site was active during the first use of the post from 1941 to 1946 and only small arms ammunition was used. This property was army-owned until 1975 and was transferred in fee title to the Forest Service and excluded from the post property boundary. The area is currently undeveloped. No known UXO response has been conducted on this site.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 5 - Negligible

CONTAMINANTS OF CONCERN:
Lead, Arsenic, OE

MEDIA OF CONCERN:
Soil

Phases	Start	End
PA	200306	200312
SI	200810	200909
RI/FS	201510	201609
RD	201610	201709
RA(C)	201710	201809

RC DATE: 201809

CLEANUP STRATEGY

Additional RI is planned. RA, including waste removal, may be needed.

FTLWD-004-R-01
NORTH GRENADE RANGE

SITE DESCRIPTION

This approximately 34-acre site is located east of the cantonment area and was used for live grenade practice. The range was not in existence based on a 1955 aerial photograph of the site; however, it is present in a 1967 aerial photograph. Fort Leonard Wood personnel speculate that the range was constructed during the late 1950s, and are not sure as to when the range was taken out of use. The site is currently undeveloped. No known UXO responses have been conducted at the site.

CLEANUP STRATEGY

Complete the RI.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 3 - Moderate

CONTAMINANTS OF CONCERN:
Lead, Arsenic, OE

MEDIA OF CONCERN:
Soil

Phases	Start	End
PA	200306	200312
RI/FS	200910	201109

RC DATE: 201109

FTLWD-005-R-01
RIFLE QUALIFYING RANGE

SITE DESCRIPTION

This range is 11.70 acres in size and is located on the northeast edge of the cantonment area. This site contains only the small, on-post portion of the range where the firing points were located. The target area of the range is off-post. Fort Leonard Wood personnel could not provide specific times of use; however, they speculate that the range was active during the first use of the post from 1941 to 1946. This site is currently undeveloped. No known UXO responses have been conducted at this range.

CLEANUP STRATEGY

Additional RI is planned. RA, including waste removal, may be needed.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 5 - Negligible

CONTAMINANTS OF CONCERN: Lead, Arsenic, OE

MEDIA OF CONCERN: Soil

Phases	Start	End
PA	200306	200312
RI	200910	201107
RD	201010	201109
RA(C)	201010	201209

RC DATE: 201309

FTLWD-006-R-01
RIFLE QUALIFYING RANGE -TD

SITE DESCRIPTION

This site has been recommended for FUDS, Findings and Determination of Eligibility (FDE) Task 2.

This 838-acre site is the target area and the majority of the safety danger zone for the qualifying rifle range that was transferred to the U.S. Forest Service. The area is located off the northeast edge of the cantonment area. Firing points were located on current Fort Leonard Wood property and firing occurred in a south to north direction. Fort Leonard Wood personnel could not provide specific times of use; however, speculate that the range was active during the first use of the post from 1941 to 1946. The land was army-owned until 1975 when it was transferred in Fee Title to the U.S. Forest Service. Fort Leonard Wood personnel state that trees in the area still contain bullets. This site is currently undeveloped.

STATUS

REGULATORY DRIVER: CERCLA

RAC SCORE: 5 - Negligible

CONTAMINANTS OF CONCERN: Lead, Arsenic, OE

MEDIA OF CONCERN: Soil

PHASES	Start	End
PA	200306	200312
RI	200910	201009
RD	201010	201109
RA(C)	201010	201209

RC DATE: 201209

CLEANUP STRATEGY

Additional RI is planned. RA, including waste removal, may be needed.

MMRP Schedule

Initiation of MMRP: 200306

Past Phase Completion Milestones

2003
• PA 12

Projected ROD/DD Approval Dates: Unknown

Projected Construction Completion: NA

Schedule for Five Year Reviews: None scheduled.

Estimated Completion Date of MMRP including LTM: 2044

FORT LEONARD WOOD MMRP SCHEDULE

(Based on current funding constraints)

AEDB-R #	PHASE	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15+
FTLWD-001-R-01	RI/FS									
	RD									
	RA(C)									
	LTM									204409
FTLWD-003-R-01	SI									
	RI/FS									201609
	RD									201709
	RA(C)									201809
FTLWD-004-R-01	RI/FS									
FTLWD-005-R-01	RI/FS									
	RD									
	RA(C)									
FTLWD-006-R-01	RI/FS									
	RD									
	RA(C)									

MMRP Costs

Total Future Requirements: **$10,171K**

Total MMR Program Cost *(from inception to completion of the MMRP):* **$10,611K**

Community Involvement

A. Efforts taken to determine interest. A survey of community interest was conducted in late 2003 and determined that there was not sufficient interest to institute a RAB. A survey was conducted in the spring of 2006 and results are expected by September 2006.

B. Results. Results have been developed into a Community Relations Plan, which is available for review at Fort Leonard Wood.

C. Conclusions. Because Fort Leonard Wood is a gaining installation for BRAC, there has been a great deal of information presented to the public concerning all aspects of the environmental program. Although the focus of the information has been on the Environmental Impact Statement (EIS) and permits, much information about the IRP, including the Installation Action Plan has been provided to the public in the form of supporting information to the EIS.

There was not significant interest expressed by the public in establishing a Restoration Advisory Board for Fort Leonard Wood.

In order to keep the public informed of ongoing IRP activities a website (see below) has been developed where information is posted. Also, press releases are distributed through the Fort Leonard Wood Public Affairs Office as necessary.

IRP Website: http://www.wood.army.mil/dpwenv/Env_Compliance/IRP/IRP_home.htm

D. Follow-up procedures. Fort Leonard Wood will reevaluate community interest periodically. The Community Relations Plan is scheduled for an update in 2007.